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# **MAPPING CRIME IN LOCAL GOVERNMENT AREAS:**

## **ASSAULT AND BREAK AND ENTER IN WAVERLEY**

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## PREFACE

In recent years, partly as a result of widespread disillusionment with the efficacy of penal policy as an instrument for crime control, there has been growing interest in the scope for crime prevention. Instead of attempting to deter offenders through the threat of tougher penalties, crime prevention initiatives aim to alter those features of the built or social environment which create criminal opportunities or make crime more likely to occur. Malicious damage to property might be countered by providing a wider range of entertainment or recreational facilities for young people. Car theft rates might be countered by improved lighting in council car parks or improved public transport. Housebreaking might be countered by community based surveillance strategies such as neighbourhood watch.

Some local councils have expressed an interest in making crime prevention projects an integral feature of the service they provide to ratepayers. Both Waverley and Fairfield Councils, for example, have participated in pilot crime prevention projects funded by the Law Foundation of New South Wales. To date, however, the development of effective crime prevention strategies has been hampered by the absence of readily accessible data on the distribution and character of different offences within Local Government Areas (LGAs). It is hard for local councils to assist police in combating public violence, for example, if all they have to hand are tallies of the incidence of assault across different LGAs. At a minimum, effective prevention strategies require a facility for monitoring the distribution of offences at street level. Ideally, they also require a facility for being able to monitor the timing and nature of different offences.

This sort of facility is a valuable adjunct to conventional law enforcement planning at a police patrol level as well. Patrol commanders constantly face the problem of how to allocate scarce resources in a way which maximizes the deterrent effects of beat police and mobile patrols. They are also always in need of information which will make them better able to identify factors underpinning particular trouble spots. Both tasks require a detailed understanding of crime trends and patterns in local communities. In the past this sort of knowledge might have been expected to accumulate simply with the benefit of experience. The professionalization of policing, however, means that mobility within the service is now more keenly valued than it used to be. This creates a need for access to more information on crime trends and patterns at patrol level than experience alone can be expected to provide.

The present report describes a facility developed by the Bureau for mapping the distribution of different offences in LGAs and analyzing their characteristics. The report examines the distribution and character of assault and break and enter in Waverley LGA with a view to illustrating how one goes about local area crime analysis and what potential benefits might be expected to flow from it. The results should be of considerable interest to local councils, police and policy makers.

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Director

October 1992

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# 1. INTRODUCTION

In recent years there has been an increasing awareness of the limits of policing and punitive sanctions as methods for deterring offenders (see, for example, Rosenbaum 1988; Smith 1986; Lipton, Martinson and Wilkes 1975). At the same time there has been a growing interest in the possibility of manipulating features of the physical or social environment as a means of preventing crime.

Many activities fall under the umbrella of crime prevention, including, for example, programs aimed at reducing social disadvantage and programs aimed at deterring juvenile offenders. The focus in this report, however, is on local area programs which are specifically targeted at known trouble spots. Such programs are aimed at removing or restricting opportunities for offending and generally fall into two main categories: (1) deterring crime by increasing the risk of observation or detection of the offender, and (2) making crime more difficult to commit through improved design or target hardening. Beat policing and neighbourhood watch programs are examples of the former; the installation of burglar alarms is an example of the latter.

In recent years, a number of Sydney municipal councils have shown interest in developing community crime prevention programs. For example, Waverley Municipal Council (1991) recently produced its Community Crime Prevention Project report which stressed the need for the availability of crime statistics at the municipal level and the development of a crime mapping system. These needs were seen as integral to the development of local area crime prevention programs, and were highlighted as recommendations of the project.

Overseas research has also identified lack of detailed local data as one of the factors that has contributed to the limited effectiveness of many community crime prevention programs (Rosenbaum 1988; Brantingham and Brantingham 1990).

Whether the concern is the more effective utilization of police resources or the need to draw the community into crime prevention programs, it is highly desirable to have a facility for identifying crime trouble spots. It is clear that a crime mapping system which allows the production of maps showing the locations of offences, together with statistical information detailing the time and characteristics of these offences, would allow local communities to identify the places most at risk and the times in which they are most at risk. In addition, analysis of the characteristics, or *modus operandi*, of offences in the local area should assist community planners and members of the community to identify the most effective means of protecting themselves and their property. The production of very detailed local area crime statistics should also be valuable in the planning and management of community policing programs: knowledge of 'hot spots' and peak times for particular offences would allow beat police and vehicular patrols to be targeted most effectively.

This report describes a methodology which can provide the kind of detailed local area crime information which is required if crime prevention programs are to be most effective. The report presents a description of a method developed for analyzing and mapping local area crime data. The method is then applied to Waverley, a Sydney Local Government Area (LGA), to demonstrate its utility. Finally the report discusses

how the results of the data analysis might be used in the development of community crime prevention programs.



## 2. METHOD

The requirements of the local area crime mapping method developed by the NSW Bureau of Crime Statistics and Research are:

- (1) a database of offence records containing information on the nature of the offence and detailed information on when and where it occurred;
- (2) a mapping facility that can be used to map locations at street address level and to aggregate the point locations to the areas of interest;
- (3) demographic data for these areas; and
- (4) a statistical analysis software package.

The mapping facility used by the NSW Bureau of Crime Statistics and Research is a commercial software package, Mapinfo.<sup>1</sup> The package is used together with digitized location data for the areas of interest; these location data consist of two files: a map file of digitized street addresses for the LGA and a boundary file of digitized boundaries for each census collection district (CD) in the LGA.

The Mapinfo package is capable of aggregating individual cases to any required geographical scale. The advantage of using CDs as the smallest geographical areas is that they are quite small and can be aggregated to form other larger areas, for example, council wards or precinct areas. (For example, in Waverley, CDs usually consist of one or two blocks, containing about 250 dwellings.)

The statistical analysis software used by the Bureau is SAS.<sup>2</sup> This package has its own programming language which is useful for editing data.

The analysis procedure is described in detail below. It consists of the following stages:

- editing the offence location data
- converting each street address location to a grid co-ordinate map reference
- attaching a CD code to each offence record
- combining the resulting data with population data for the CDs, to determine offence rates for each CD
- mapping the CDs with various shadings to show the offence rate patterns for the whole of the LGA.

The offence data need to be edited to ensure that the street addresses for each offence in the data set can be recognized by the mapping software package. There are two stages in this editing process. The first involves listing a frequency distribution of all street names in the data set. This listing is used to write an algorithm to convert all incorrect spellings of street names to the correct spellings. The second stage involves editing the data field containing the street number, to ensure that only one recognizable number is included in this data field. For example, if the number consists of a flat or unit number followed by a slash and then a street number, the data item must be changed to contain

the street number only. Where no street number is given, other location information on the record may be used to determine the relevant street number. For example, if a location is specified as 'outside the Bondi Hotel', the street address of the Bondi Hotel can be inserted into the record.

The edited data set is then input to Mapinfo, the mapping package, together with a map file containing digitized map co-ordinates for all street addresses in the LGA.<sup>3</sup> Mapinfo creates point maps of the exact locations of the offences in the LGA. Each point map is a map of the LGA, somewhat like a street directory map, with a point marking the address at which each recorded offence occurred.

The next stage of the analysis consists of assigning to each offence record, a code representing the CD in which it occurred. This process is carried out automatically by Mapinfo which overlays the CD boundary files on the point maps, and assigns, to each offence record, the code of the CD in which its location falls.

The data are then passed into SAS and the number of offences occurring in each CD calculated. From these data a file containing the number of offences in each CD is produced. This file is then combined with a file containing the resident population and the number of dwellings in each CD (derived from census data). Offence rates are then calculated for each CD (for example, rates per 100,000 population for assault; rates per 1,000 households for break and enter). Finally, the data are passed from SAS back to Mapinfo, allowing offence rates to be mapped at CD level.

### 3. APPLICATION OF THE METHOD TO WAVERLEY

To demonstrate the method it was applied to the Sydney LGA of Waverley. Two offences of major public concern were selected for analysis: assault and break and enter. Only break and enter offences involving dwellings were included in the analysis.

This section of the report describes Waverley and the reasons for selecting it as the sample LGA for analysis; compares Waverley with other Sydney LGAs; and describes the data sources for the analysis.

#### 3.1 SELECTION OF WAVERLEY

There are a number of reasons why Waverley was selected for this pilot study. Waverley is a municipality that has a demonstrated interest in the development of community-based crime prevention programs. In addition, Waverley is a relatively small LGA. This was important because it reduced the amount of work required to edit and check addresses of offences in the data set. Also, on a rate per 100,000 population basis, Waverley has relatively high rates of assault and break and enter compared with other LGAs in the Sydney Statistical Division.

Waverley LGA is situated in the Eastern Suburbs of Sydney. The location of Waverley LGA is shown in Figure 1. The LGA includes the suburbs of Waverley, Bondi Junction, Bondi Beach, Bronte and Dover Heights as well as parts of Rose Bay and Vaucluse.

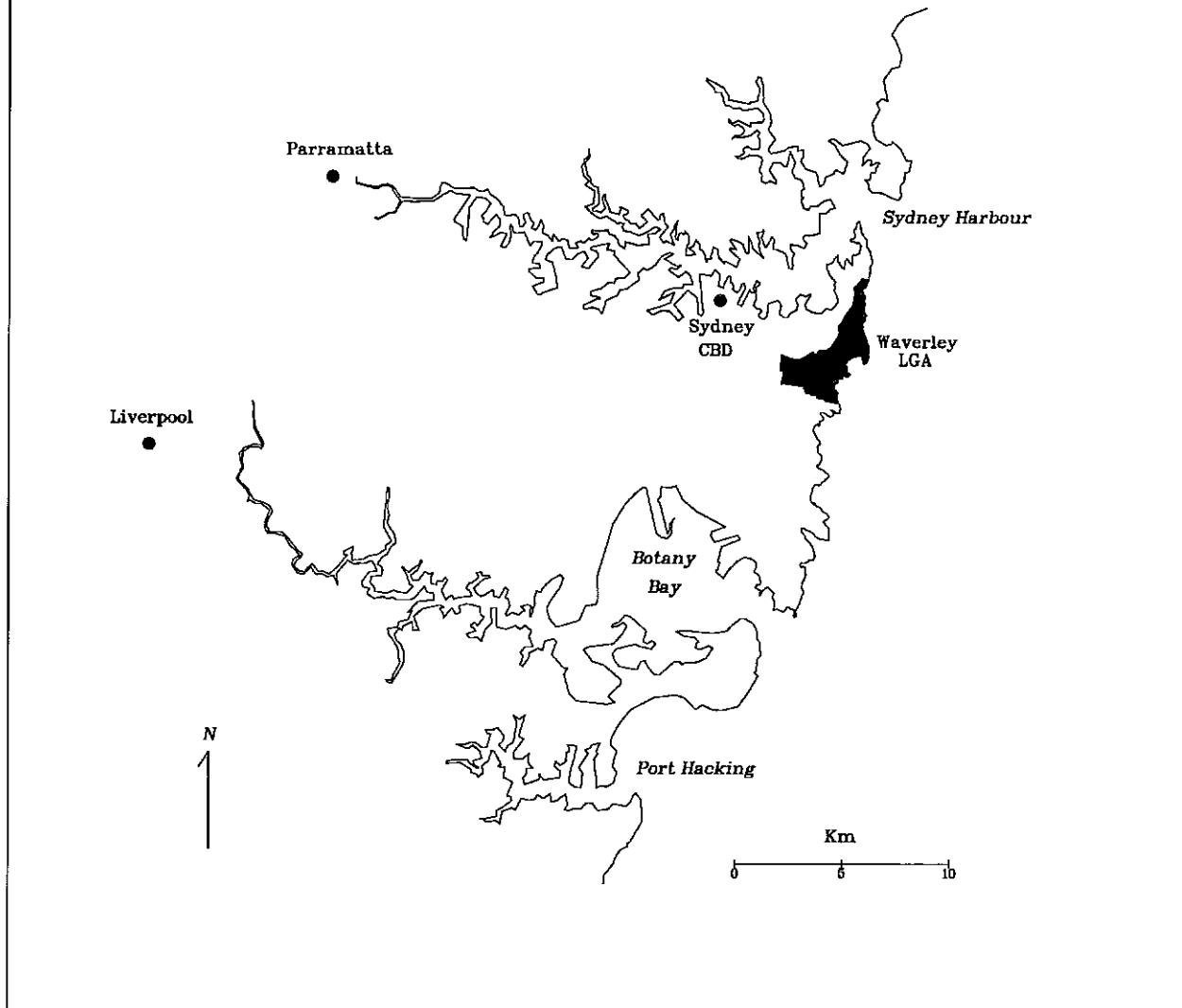
In addition to being a relatively small LGA, with an area of 899.5 ha, Waverley was the most densely populated municipality in NSW at the 1986 census. As one would expect from this, a high proportion of the dwellings in Waverley are flats and other medium density dwellings. At the 1986 census, 58.6 per cent of the dwellings in Waverley were of this type, compared with 24.1 per cent of the dwellings in the Sydney Statistical Division as a whole. Waverley also has a relatively high proportion of households that are rented, with 43.8 per cent of dwellings rented in Waverley compared with 27.8 per cent in the Sydney Statistical Division.

Waverley's population has a smaller proportion of young people and more older people compared with the Sydney Statistical Division as a whole. At the 1986 census, 14.3 per cent of the population of Waverley were aged 0-14 years, with 14.7 per cent aged 65 years or more. By contrast, in the whole of the Sydney Statistical Division, 22.2 per cent were aged 0-14 years and 10.8 per cent were aged 65 years or more. Waverley also has higher proportions of people who are separated or divorced, a higher proportion of persons employed as managers or professionals, and a higher proportion of persons with university degrees compared with the Sydney Statistical Division.

**Table 1: Sydney LGAs ranked by rate of recorded assault and break and enter offences, 1990**

<i>Rank</i>	<i>LGA name</i>	<i>Assault</i>	<i>LGA name</i>	<i>Break and enter</i>
		<i>Rate per 100,000 population</i>		<i>Rate per 1,000 households</i>
1	Sydney	3246.1	Blacktown	64.4
2	Manly	687.2	Strathfield	63.9
3	Leichhardt	671.7	Campbelltown	58.7
4	Botany	660.1	Fairfield	55.3
5	Auburn	657.4	Holroyd	54.3
6	Wyang	611.5	Auburn	49.8
7	Liverpool	544.3	Burwood	48.2
8	Waverley	543.1	Sydney	48.1
9	Randwick	535.2	Parramatta	46.5
10	Parramatta	527.6	Penrith	46.2
11	Campbelltown	505.7	Hunters Hill	45.6
12	Strathfield	499.1	Marrickville	45.2
13	Holroyd	458.8	Ashfield	43.1
14	Gosford	455.2	Canterbury	42.7
15	Blacktown	451.8	Leichhardt	42.6
16	Marrickville	437.2	Hawkesbury	42.5
17	Fairfield	415.5	Rockdale	39.9
18	Penrith	409.4	Liverpool	39.9
19	Ashfield	390.8	Woollahra	38.7
20	Burwood	375.8	Waverley	38.5
21	Blue Mountains	359.2	Baulkham Hills	38.2
22	North Sydney	345.2	Concord	36.2
23	Bankstown	332.8	Lane Cove	33.5
24	Warringah	302.3	Kogarah	33.3
25	Sutherland	301.1	Bankstown	32.7
26	Ryde	293.9	Randwick	32.6
27	Rockdale	291.1	Drummoyne	32.1
28	Canterbury	287.6	North Sydney	31.8
29	Hurstville	287.4	Willoughby	31.6
30	Hawkesbury	279.2	Ku-ring-gai	29.0
31	Woollahra	264.6	Manly	28.8
32	Kogarah	260.2	Hurstville	27.8
33	Mosman	256.9	Ryde	27.1
34	Hunters Hill	241.6	Blue Mountains	25.5
35	Hornsby	241.0	Camden	25.2
36	Concord	229.3	Wollondilly	24.6
37	Wollondilly	209.6	Mosman	23.4
38	Willoughby	209.1	Hornsby	23.1
39	Drummoyne	180.4	Sutherland	22.7
40	Baulkham Hills	172.6	Botany	22.0
41	Camden	169.4	Warringah	21.7
42	Lane Cove	161.2	Wyang	20.3
43	Ku-ring-gai	121.2	Gosford	19.4

NOTE: The population and household data used for calculating rates were obtained from the 1986 census.

**Figure 1: Location of Waverley LGA**

### **3.2 ASSAULT AND BREAK AND ENTER IN WAVERLEY LGA COMPARED WITH OTHER SYDNEY LGAs**

While most of this report is concerned with variations in crime within Waverley LGA, this section briefly compares rates of assault and break and enter in Waverley with those in the other LGAs in the Sydney Statistical Division. As mentioned above, in recorded crime statistics available from the Bureau (NSW Bureau of Crime Statistics and Research 1991), Waverley had relatively high rates of assault and break and enter on a rate per population basis. In Table 1 the LGAs in the Sydney Statistical Division are shown ranked by rate of assault per 100,000 population, and rate of break and enter per 1,000 households.

Table 1 shows that in 1990 Waverley LGA had the 8th highest assault rate of all LGAs in the Sydney Statistical Division. In contrast, it ranked 20th in terms of break and enter

per 1,000 households. In 1990, an average of 3.9 per cent of households in Waverley were recorded victims of break and enter.<sup>4</sup>

A problem with the sorts of comparisons made in Table 1 is that an overall rate per LGA may mask large variations in rates within LGAs. Just as Sydney as a whole has patterns of hot spots, where offence rates are high, and cold spots, where offence rates are low, within individual LGAs there is considerable variation in crime rates from neighbourhood to neighbourhood. This means that LGA level comparisons are of limited use if we are interested in formulating crime prevention programs that are targeted at specific local problem areas.

In Sections 4 and 5 patterns of assault and break and enter within Waverley are examined, with a view to identifying the hot spots and cold spots for these offences. As will be seen, the crime rate variation within Waverley is considerable, even when compared with the variation across Sydney LGAs shown in Table 1. Also, there is considerable variation of offending in time, with some months, days and hours having higher rates of occurrence of these offences than others. Temporal patterns of offending are therefore examined in order to identify the times during which crime prevention programs can most profitably be targeted.

### **3.3 DATA FOR WAVERLEY**

The data used for this study were the following:

- offence data for 1989 and 1990
- demographic data for Waverley CDs from the 1986 census
- map files for Waverley streets and boundary files for Waverley CDs.

The offence data were extracted from a database of all offences recorded by the police in 1989 and 1990 to provide two years of data for analysis. The postcode of the location of the offence was used to extract records for Waverley. Only records for assault and break and enter offences were included in the data set for analysis.

It is possible for a single incident to result in one or more offences. For example, if in one break and enter incident both the house and garage are burgled then two offences may be recorded. For mapping purposes, only one offence per incident was included in the data set.<sup>5</sup>

The offence data set contained the following information: the street address of the location of the offence, the type of offence, the time of day the offence occurred, the date the offence occurred and the type of premises where the offence occurred, and the point and method of entry for break and enter offences. It should be noted that, for both assault and break and enter, rates derived from police data do not necessarily represent the true rate of occurrence of the offence. The most recent Crime and Safety Survey in NSW (Australian Bureau of Statistics 1991) indicates that only about 30 per cent of assaults and 72 per cent of completed break and enters in NSW are reported to the police. It is often argued that there is considerable potential for bias to be introduced into comparative crime statistics if people in some areas are more likely to report to the police than others. However, research has failed to demonstrate that official statistics

are rendered invalid for comparisons of relative crime rates by such bias. These questions are considered in some detail in two recent Bureau reports (Devery 1991, 1992). It is well to realize, however, that for both offences, but particularly for assault, the actual offence rate is likely to be somewhat higher than the rates reported here.

The demographic data for Waverley were derived from the 1986 census conducted by the Australian Bureau of Statistics.<sup>6</sup> The map files and CD boundary files for Waverley were obtained from Mapinfo.

## 4. PATTERNS OF ASSAULT IN WAVERLEY

### 4.1 SPATIAL PATTERNS

Assault is very unevenly distributed across local neighbourhoods in Waverley LGA. That is, many more assaults occur in some areas than in others. The variation at the level of individual streets is shown in Table 2. In 1989 and 1990, 51.4 per cent of all assaults in the Waverley LGA occurred in only 9 streets. Some 24.3 per cent, or almost one quarter of reported assaults in Waverley, occurred in Campbell Pde or Oxford St. Campbell Pde and Oxford St are in the centre of the two main high assault areas in the LGA. One of these areas is the beach area in the east of the LGA. This area contains a number of the top ranked streets like Campbell Pde, Queen Elizabeth Dr and Curlewis St. The other high assault area is Bondi Junction in the west of the LGA, containing Oxford St, the first section of Bronte Rd and Spring St. These two high assault areas are linked by Bondi Rd, which was the street with the third highest number of assaults in the LGA. This means that 30.7 per cent of the assaults in Waverley occurred in or outside addresses along the continuous roadway from Oxford St in the west, via Bondi Rd, to Campbell Pde in the east. These streets and areas are very much the centres of commercial development in Waverley, being areas with concentrations of clubs, hotels and restaurants. It would appear that many of the assaults in Waverley are associated with this kind of land use. A map showing some of the main streets in Waverley can be found in Figure 2.

The pattern of high assault areas that is suggested by the top ranked streets for assault in Waverley is confirmed by Figure 3, which shows the CDs in Waverley classified by assault rate per 1,000 population. Collection districts were classified into three categories.

**Table 2: Waverley streets ranked by number of recorded assault offences, 1989 and 1990**

<i>Street</i>	<i>Frequency</i>	<i>%</i>
Campbell Pde	84	14.1
Oxford St	61	10.2
Bondi Rd	38	6.4
Old South Head Rd	32	5.4
Queen Elizabeth Dr	26	4.4
Curlewis St	18	3.0
Bronte Rd	17	2.8
Ebley St	16	2.7
Spring St	15	2.5
Other	290	48.6
Total	597	100.0



**Figure 2: Main streets of Waverley**

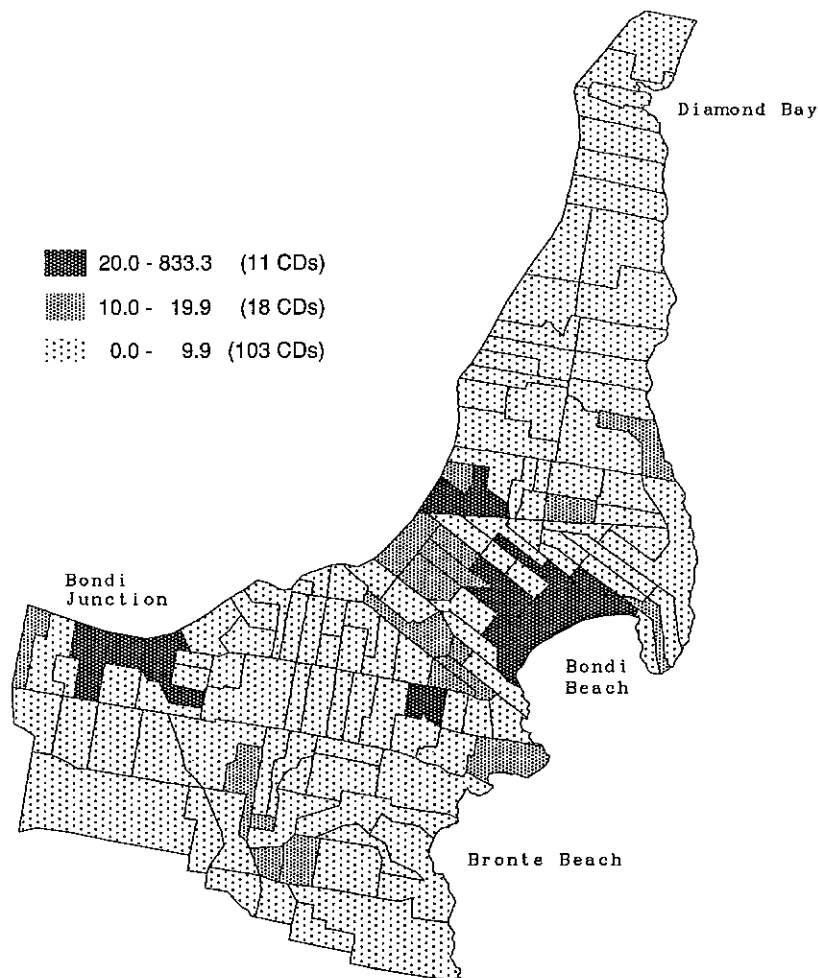
The high assault rate CDs are the 11 CDs with assault rates greater than 20 per 1,000 residents and are shown with dark shading in Figure 3. Areas with moderate assault rates are the 18 CDs with assault rates between 10 and 19.9 per 1,000 residents. Low assault rate areas on the map were classified as those CDs with assault rates less than 10 per 1,000 residents.

These classifications reveal that assault rates in the high assault rate CDs in Waverley are very high when compared with the rates for Sydney LGAs shown in Table 1. Converted to a rate per 100,000, the cutoff point for the high assault rate category in Figure 3 (2,000 per 100,000 population) is well above the rates for all of the LGAs in the Sydney Statistical Division, except for Sydney LGA. Indeed, a number of CDs in Waverley had assault rates that were greater than that of Sydney LGA. This comparison underlines the value of local area statistics when assessing the magnitude of local crime

problems. Such areas with very high, but very local, crime rates cannot be identified when LGA level data are used.

The map in Figure 3 indicates that assaults recorded in Waverley are very concentrated, with a few CDs accounting for a large proportion of the assaults. In 103 of the 132 CDs in Waverley fewer than 1 in 200 people per annum were the victims of a recorded assault.<sup>7</sup> Figure 3 shows that the 11 CDs with very high assault rates are clustered around the Bondi Beach and Bondi Junction areas. These 11 CDs constitute 8.3 per cent of CDs, but were the scene of 36.2 per cent of the assaults that occurred in 1989 and 1990 in Waverley. In the 11 CDs with the highest assault rates, there were an average of 19.6 assaults in each CD over the two year period. In the remainder of the LGA, there were an average of only 3.1 assaults per CD.

**Figure 3: Recorded assaults in Waverley CDs  
Rate per 1,000 population, 1989 and 1990**



These high rates might appear to imply that the residents of the 11 high assault rate CDs are very violent. However, it is possible that many of the offenders and victims of the assaults in these CDs did not reside in the immediate area of the assault. This is because the high assault rate CDs contain concentrations of hotels, restaurants, clubs and other entertainment venues, and consequently attract large numbers of visitors, tourists and revellers. Interviews with police in Waverley which were reported in the Waverley Municipal Council's (1991) Community Crime Prevention Project report support these observations. The police in Bondi were of the opinion that a large percentage of the reported assaults in Waverley occur in and around licensed premises, and involve both offenders and victims who are intoxicated. Similar findings were reported in a Bureau study of aggravated assault in NSW (Robb 1987).

The extent to which assaults occurring in hotels and clubs influence the high rates of assault in some CDs in Waverley is indicated in Table 3. In this table the three category grouping of CDs in Figure 3 is collapsed by combining the two low assault rate categories. Thus, in Table 3 the high assault rate CDs are the 11 CDs with dark shading in Figure 3, and the low assault rate CDs are the remainder of CDs in the LGA (121 CDs). This table shows the sites of assaults that occurred in the high and low assault areas in Waverley. In both categories of CDs, a high proportion of recorded assaults occurred in the streets, with 34.3 per cent of assaults in the 11 high assault rate CDs, and 37.0 per cent of assaults in the 121 low assault rate CDs occurring in the street. The high assault rate CDs are distinguished, however, by the relatively high percentage of assaults that occurred in hotels or clubs. In these areas 27.3 per cent of assaults occurred in such premises, compared with only 1.3 per cent of the assaults in the balance of the CDs.

**Table 3: Sites of assaults occurring in the high and low assault rate CDs in Waverley**

<i>Site of assault</i>	<i>High assault rate CDs (11 CDs)</i>		<i>Low assault rate CDs (121 CDs)</i>		<i>Total</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
Street	74	34.3	141	37.0	215	36.0
Flat or house	29	13.4	168	44.1	197	33.0
Hotel or club	59	27.3	5	1.3	64	10.7
Shop or business premises	26	12.0	25	6.6	51	8.5
Beach or park	14	6.5	5	1.3	19	3.2
Other	14	6.5	37	9.7	51	8.5
Total	216	100.0	381	100.0	597	100.0

Not only do a large proportion of the assaults in high assault rate CDs occur in hotels or clubs, a large proportion of the assaults in the street in these CDs occur outside such premises. Of the 74 assaults that occurred in the streets of the 11 high assault rate CDs,

23 (31.1 per cent) could be positively identified as occurring outside a hotel or club. In contrast, only 1 of the 141 assaults in the streets of the low assault rate CDs could be identified as occurring outside a hotel or club.<sup>8</sup>

The low assault rate CDs are distinguished by the high proportion of assaults which occurred in dwellings, 44.1 per cent inside a flat or house compared with only 13.4 per cent in the high assault rate CDs.

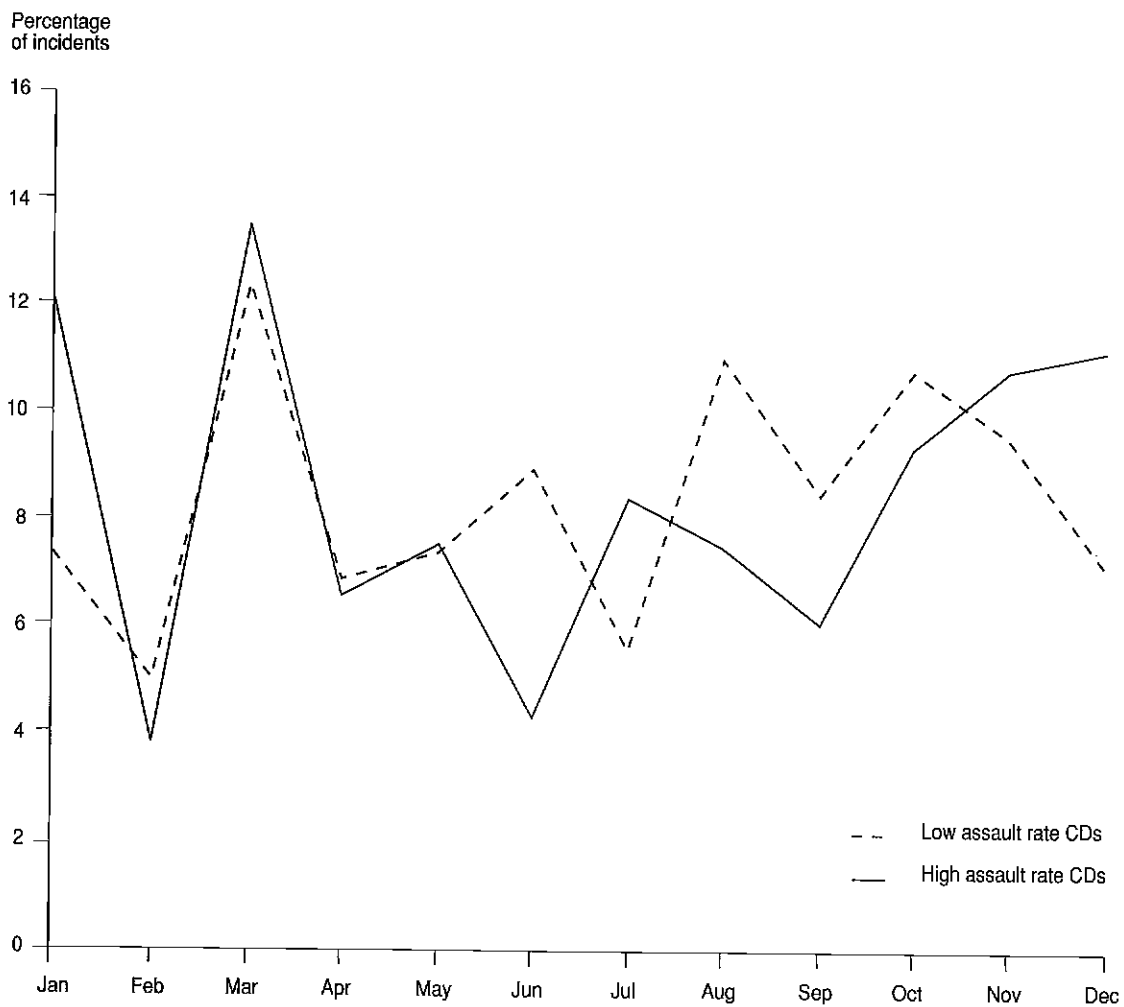
Apart from those few CDs that have very high assault rates, from these data one might conclude that the risk of assault in the predominantly residential areas of the LGA is small. However, we must not forget that some kinds of assault may be particularly likely to go unreported. This is the case where the victim is related to the offender, and fear or lack of power (especially in the case of female or child victims) militate against the assault being reported. It might be suggested that the concentration of assault observed in Waverley in this study may be a result of under-reporting of these kinds of household violence. However, a number of factors suggest that this is not the case.

First, the variation in assault rates is very large. This means that extraordinarily high levels of hidden offending would have to exist if the true rate of assault in the low assault rate areas was of the same magnitude as in the high assault rate CDs. Second, there is some evidence that the sorts of violence associated with hotels and clubs also very commonly goes unreported. This means that in both areas the recorded rates of assault victimization are somewhat understated. In their observational study of hotel violence, Tomsen, Homel and Thommeny (1991) observed 30 assaults. Police were called in only three cases, and took action in only one case. Interestingly, Homel et al.'s research suggests that the predominantly young, working class victims of hotel violence face some of the same sorts of difficulties with police intervention as do victims of domestic violence (Homel and Tomsen 1991). Many of the victims of such assaults do not precipitate the violence, and are physically smaller than their assailants. They are, however, commonly perceived by police as partly responsible for their predicament. Few such assaults are reported, and when police do become involved they are often reluctant to take action unless the assault is very serious, often advising victims to seek civil redress. Tomsen, Homel and Thommeny (1991, p. 190) conclude that 'there are great difficulties and a slim likelihood of a legitimate victim of public drinking violence getting adequate redress from the legal system'. Hence, given that both domestic violence and pub-related violence are subject to under-reporting, we can probably conclude, on balance, that the distribution of assault rates in Waverley CDs, as revealed by recorded rates, is not likely to be unduly influenced by reporting bias.

Consistent with the differences in the site of assault between high and low assault rate CDs, there was a very clear difference in the sex ratio of assault victims in the high and low assault rate CDs. In the high assault rate CDs the majority of victims were male (71.4 per cent). Females accounted for only 24.9 per cent of victims in those areas.<sup>9</sup> In the low assault rate CDs the proportion of female victims was much higher (45.5 per cent) than in the high assault rate areas. This difference appears to be due entirely to the predominance of assaults in the home in the low assault rate CDs. As noted above, 44.1 per cent of the assaults occurring in the low assault rate CDs were situated in the home. Of these assaults in the home in the low assault rate CDs, 68.3 per cent of victims were female. Assault 'in the home' was the only location in both groups of CDs where the proportion of female victims was larger than the proportion of male victims.

In summary, there is considerable variation in assault rates across the Waverley CDs. The CDs with high assault rates tend to be concentrated in the Bondi Beach and Bondi Junction areas. In all areas, assaults in the street are a significant proportion of all assaults. In those CDs where assault rates are high, high proportions of assaults occur in or around licensed premises. In the rest of the CDs assaults are more likely to occur in the home. In the high assault rate CDs most victims are male, whereas the proportion of female victims is higher in the low assault rate CDs.

**Figure 4: Month of year of assault  
in high and low assault rate CDs in Waverley**

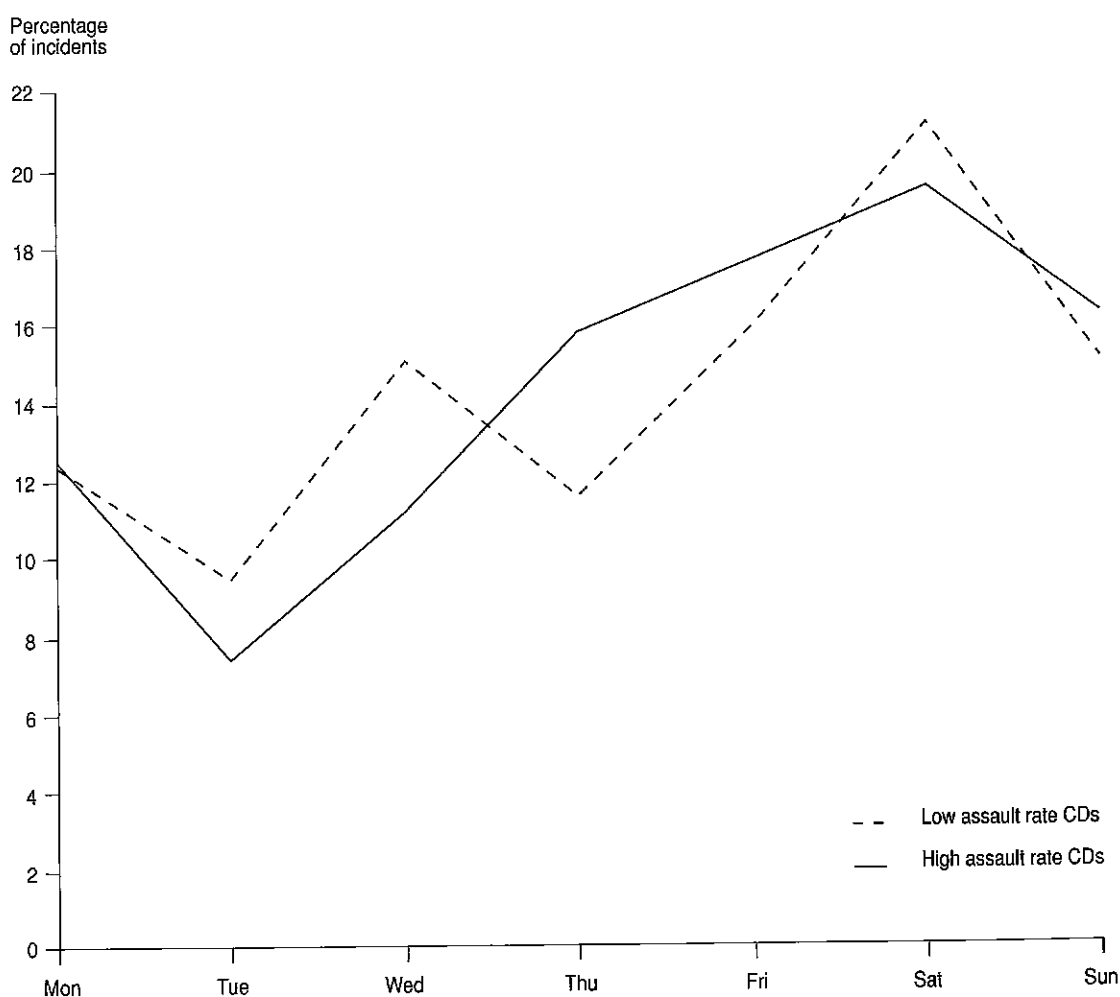


## 4.2 TEMPORAL PATTERNS

### 4.2.1 Time of year

Assaults are more likely to happen at some times of the year than others. As shown in Figure 4, in the high assault rate CDs, there is a tendency for recorded assaults to increase in the spring and summer months, from September through to January. In comparison, in the low assault rate CDs recorded assaults tend to decrease during these months. Nonetheless, the major peak for assault in both categories of CDs is in March, with minima in February. However, as is apparent from Figure 4, overall assault rates in the summer months are not much higher than those in the winter months. This is somewhat surprising, given that assault peaks in summer have been commonly observed

**Figure 5: Day of week of assault in high and low assault rate CDs in Waverley**

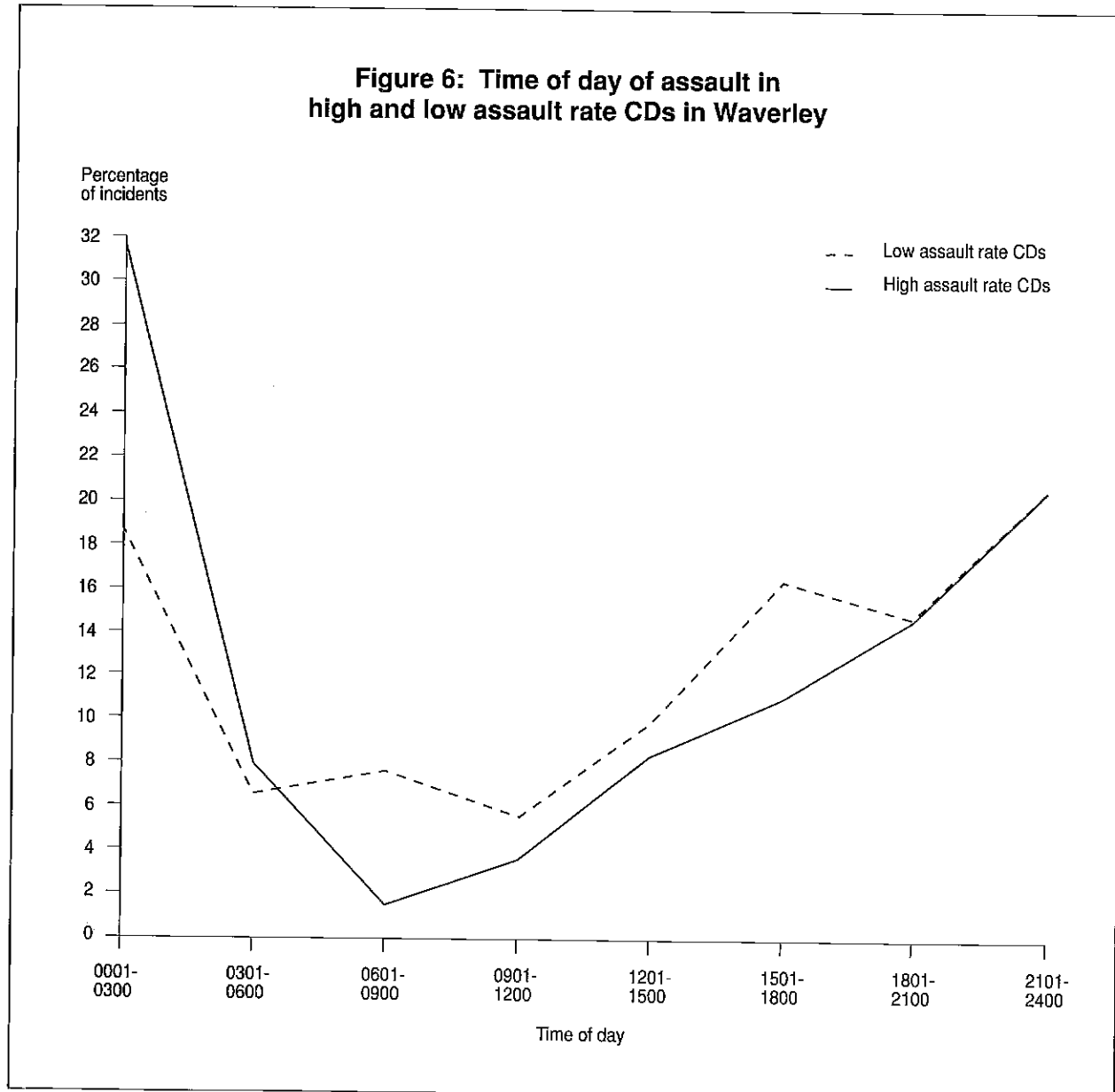


in other studies (Conklin 1980). It is possible that much of the drinking related violence that occurs in Waverley is not primarily associated with crowds drawn to the beach in the summer, but with persons attracted to entertainment in hotels and clubs which occurs all year round.

#### 4.2.2 Day of week

Assaults are also more likely to occur on some days of the week than others. Indeed, Figure 5 shows that assaults occur disproportionately on weekends, with the major peak on Friday, Saturday and Sunday. This pattern is confirmed by other Australian research (Wallace 1986, Robb 1987), and research from overseas (Conklin 1980). As can be seen from Figure 5 the pattern of assault across the days of the week is the same for high and low assault rate CDs in Waverley ( $X^2 = 4.6$ , d.f. = 6,  $p > 0.05$ ).

**Figure 6: Time of day of assault in high and low assault rate CDs in Waverley**



### 4.2.3 Time of day

As may be expected, there was also considerable variation in the pattern of assault according to the time of day. This variation is shown in Figure 6. Assaults in both high and low assault rate CDs peak in the period between 2101 and 0300 hours. This peak was more marked in the high assault rate CDs, where 31.8 per cent of assaults occurred in the peak period of 0001 to 0300 hours, compared with the low assault rate CDs where only 18.8 per cent of assaults occurred in this period. A higher proportion of assaults in the low assault rate CDs occurred during the daylight hours between 0601 and 1800 hours. The difference between high and low assault rate CDs in terms of time of day of assault was statistically significant ( $X^2 = 20.8$ , d.f. = 7,  $p < 0.05$ ). In other words, although both groups of CDs showed a tendency for assaults to peak after midnight, assaults in the low assault rate CDs were more evenly spread through the day.

This difference in the patterns of times of assault in the two groups of CDs is likely to reflect the patterns of activity in the two sets of areas. In the high assault rate CDs, assaults peak between 2101 and 0300 hours, a period of peak activity in pubs and clubs which coincides with closing time. It is difficult to ignore the suggestion that alcohol consumption is associated with many of the assaults occurring in these areas at this time. In the low assault rate CDs, the peak rate was still in the period around midnight, but a higher proportion of assaults occurred during daylight hours. Small peaks between 0601 and 0900 hours, and between 1501 and 1800 hours suggest that a proportion of domestic disputes occur around the time people leave for work or arrive home.



## 5. PATTERNS OF BREAK AND ENTER IN WAVERLEY

### 5.1 SPATIAL PATTERNS

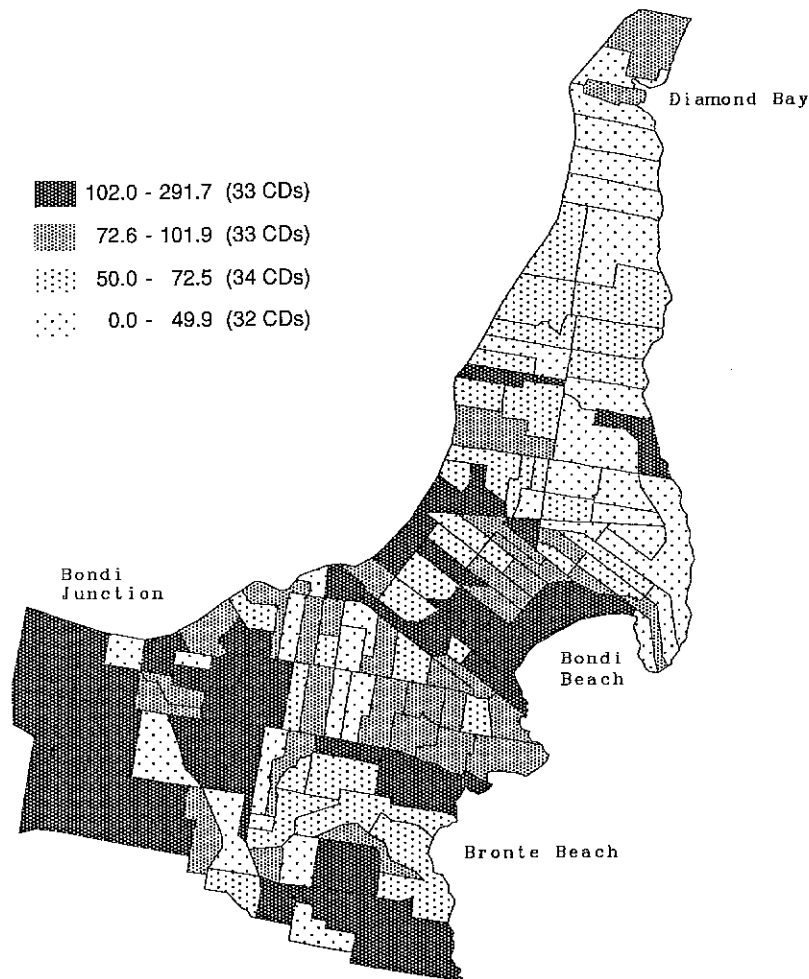
The spatial pattern of break and enter in Waverley is less concentrated than that of assault. Nevertheless, Table 4 shows that 30.4 per cent of break and enters in 1989 and 1990 occurred in only 13 streets. Apart from Old South Head Rd, which joins Bondi Junction in the west to Vaucluse in the north of the LGA, and Military Rd, which joins the north of the LGA to the Bondi Beach area, these streets are located in the south and south west of Waverley LGA.

**Table 4: Waverley streets ranked by number of recorded break and enter offences, 1989 and 1990**

<i>Street</i>	<i>Frequency</i>	<i>%</i>
Old South Head Rd	100	4.4
Bondi Rd	89	4.0
Campbell Pde	74	3.3
Bronte Rd	56	2.5
Birrell St	55	2.4
Francis St	55	2.4
Penkivil St	44	2.0
Curlewis St	38	1.7
Sir Thomas Mitchell Rd	37	1.6
Military Rd	34	1.5
Ocean St	34	1.5
Wellington St	34	1.5
Roscoe St	33	1.5
Other	1566	69.6
Total	2249	100.0

Figure 7 shows the pattern of break and enter per 1,000 households in Waverley CDs. The CDs were grouped into 4 categories, with each category containing approximately 25 per cent of CDs. In the CDs with darkest shading, which are the CDs with the highest break and enter rates, more than one in 10 households (10.2 per cent) on average were recorded victims of break and enter in 1989 and 1990. In the next category, approximately 7 to 10 per cent of households were victimized. In the second last category, victimization rates were between 5 and 7 per cent of households. In the lowest category, less than 5 per cent of households were recorded victims of break and enter. Some 37.2 per cent of break and enters in Waverley in 1989 and 1990 occurred in these lowest CDs. By contrast, in the two CDs with the highest break and enter rates in Figure 7, over 25 per cent of households on average were victims of break and enter.<sup>10</sup>

**Figure 7: Recorded break and enter in Waverley CDs  
Rate per 1,000 households, 1989 and 1990**



It is immediately apparent from Figure 7 that break and enter offences are concentrated in the southern and western parts of the LGA. The comparatively affluent northern sectors of Waverley, including Dover Heights and part of Vaucluse, had relatively low rates of break and enter. A number of CDs in the Bondi Beach and Bondi Junction areas which had high rates of assault also had high rates of break and enter.

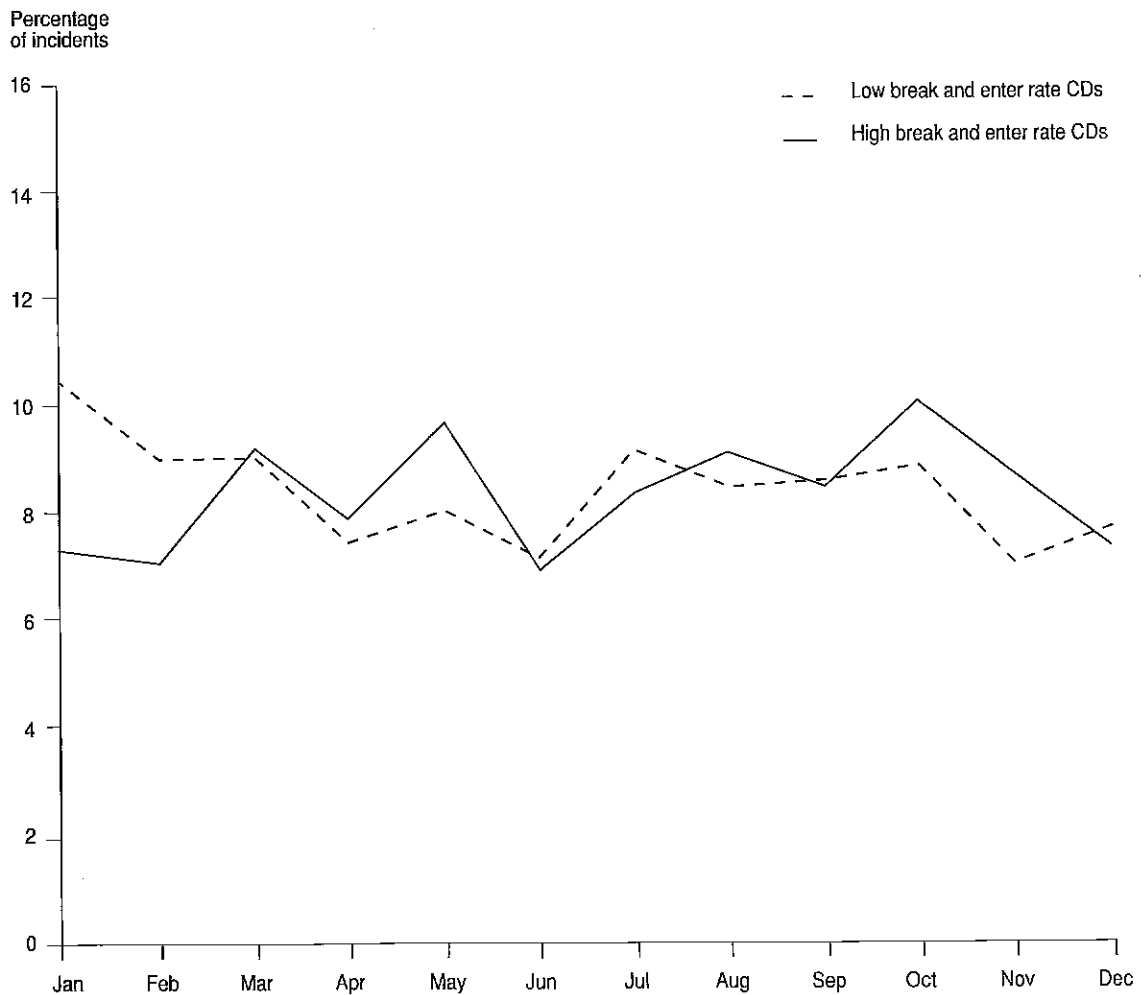
In the following sections, CDs are classified in a similar manner to the classification in the section on assault. The CDs with break and enter rates classified as high are the 33 CDs in the highest category in Figure 7, where the rate was equivalent to more than 10 per cent of households being victims of this offence in 1989 and 1990. The remaining 99 CDs in Waverley are classified as having low rates of break and enter.

## 5.2 TEMPORAL PATTERNS

### 5.2.1 Time of year

While it has often been found that many offences tend to peak in the summer months, break and enter has been found to exhibit limited seasonality (Shover 1991). This is the case in Waverley, as shown in Figure 8. In the low break and enter CDs, offences peak in January and decline until June. In the rest of the Waverley CDs there appears to be little obvious seasonality, with peaks of break and enter in May and October. It has been suggested that the tendency to leave windows and doors open during warmer weather affords greater opportunity for break and enter during these times (Shover 1991). This may be the case, but in Waverley it appears that the effect is not large.

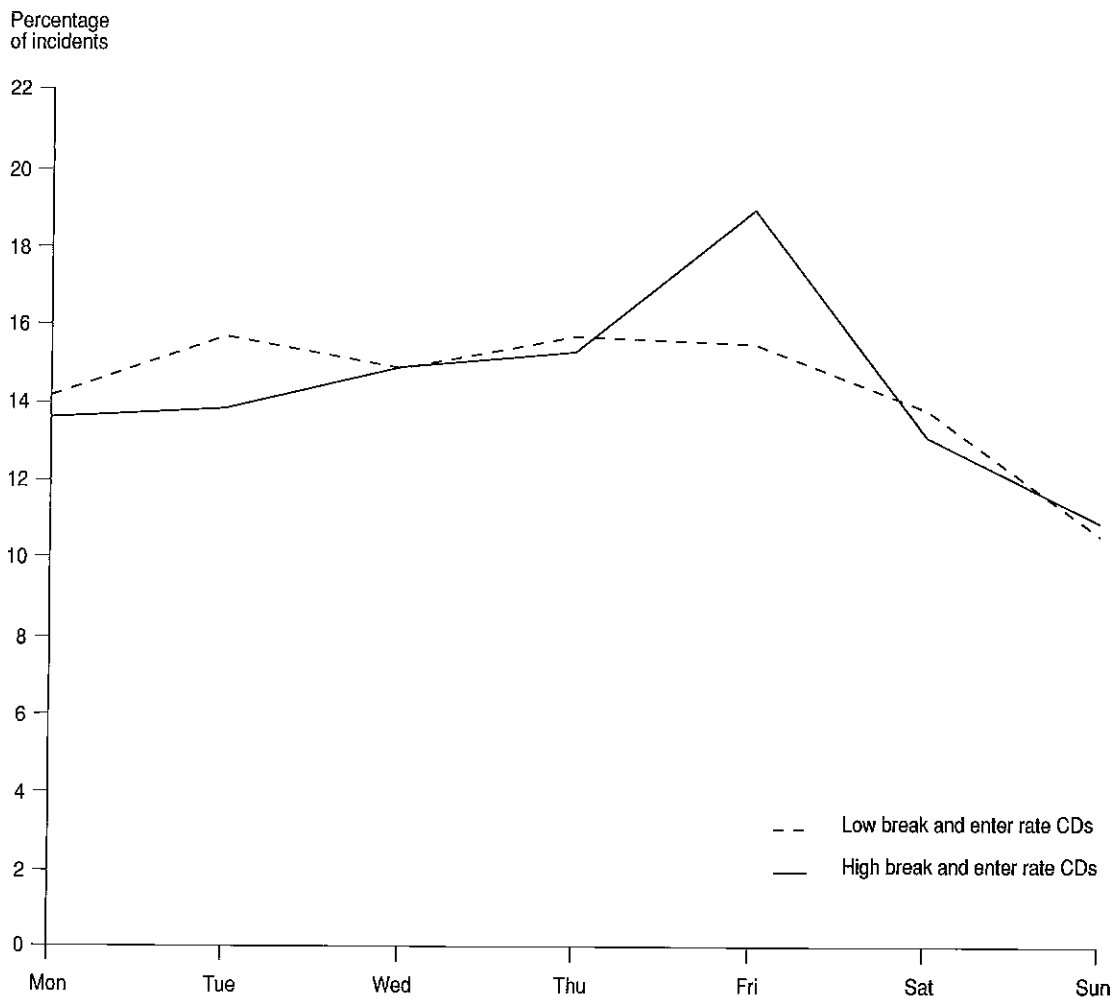
**Figure 8: Month of year of break and enter in high and low break and enter rate CDs in Waverley**



### 5.2.2 Day of week

In their study of burglary patterns, Rengert and Wasilchick (1985) found that the occurrence of burglaries is strongly determined by the daily habits of the burglary victims. Household burglaries peak at times when target premises are unoccupied. Research by Rengert and Wasilchick, and by Cromwell, Olson and Avary (1991), has found that burglars are often highly attuned to victim's use of time. Typically they take advantage of the often predictable routines of daily activities in many households, and use a range of methods to ensure that houses are in fact unoccupied (Cromwell, Olson and Avary 1991).

**Figure 9: Day of week of break and enter in high and low break and enter rate CDs in Waverley**



The fact that the daily routine of many households is determined by journeys to and from work is reflected in Figure 9. This figure shows that, in contrast to the day to day pattern of assault, break and enters tend to decline on the weekend, with numbers relatively constant between Monday and Friday. In the high break and enter rate CDs there was a peak on Friday, but overall there is no statistical difference between the sets of areas in terms of the days of the week on which break and enters tend to occur ( $X^2 = 5.5$ , d.f. = 6,  $p > 0.05$ ). Many households are left unguarded during the weekdays, particularly as the number of women participating in the labour force has increased. As Walker (1991) has pointed out, these and other social changes have tended to increase opportunity for burglary in recent years because many houses are much more likely to be vacant during working hours than previously. This means that there are more vacant houses, and fewer people in neighbouring houses who might be able to deter burglary by making it more likely for a burglar to be observed. On weekends, it is likely that there is more activity in the streets and yards of residential property, thus making it more difficult for burglars to ply their trade unnoticed.

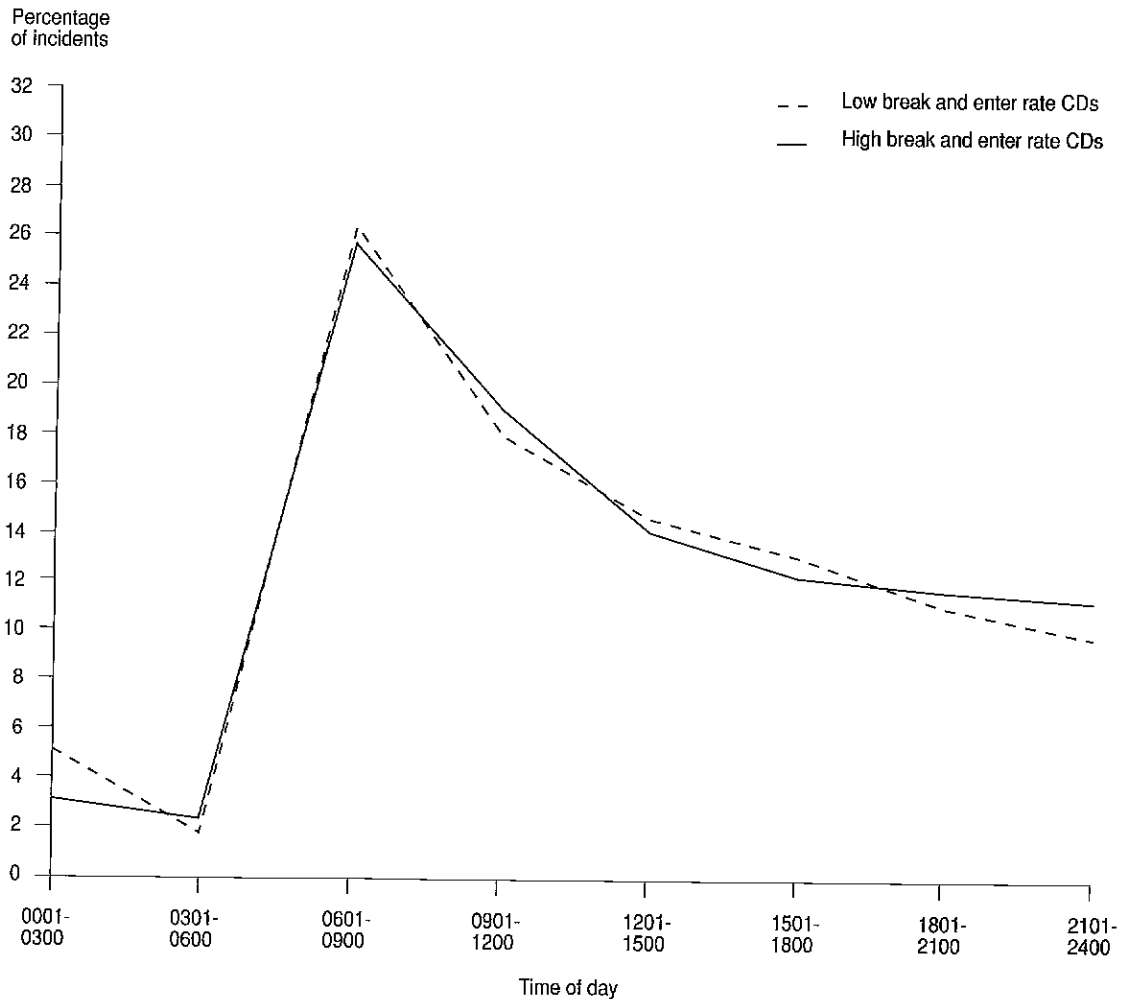
### 5.2.3 Time of day

Patterns of hourly activities related to work can also explain the variation of break and enter according to the time of day. There is some difficulty in inferring the exact time of the offence for break and enter from police data. Police statistics record the time the offence started and the time that the offence finished. For break and enters, the offence start time often refers to the time that the premises were vacated. Similarly, the offence finish time generally refers to the time at which residents returned home and discovered that their home had been broken into. In Waverley, 25 per cent of break and enters were discovered within 3.5 hours, 50 per cent were discovered within 7.5 hours, and 75 per cent were discovered within 11.8 hours. There were a small number of cases where the burglary was discovered some days (up to one month) after the premises were vacated. In these cases it is most likely that the household was left unoccupied over holidays. The offence may have occurred at any time in the period during which the premises were unoccupied. For the purposes of this analysis the time the premises were vacated was used.

While there is a problem with locating the exact time of burglary offences, the overall pattern confirms that the highest risk times for break and enter are those times when the property is not occupied during working hours. Figure 10 shows that, in both high and low break and enter rate CDs, offences peak in the morning between 0601 and 0900 hours, and decline through the day with the lowest rates occurring between 0001 and 0600 hours. The very pronounced peak between 0601 and 0900 hours obviously reflects in part the tendency of people to vacate their home in pursuit of their daily activities between these hours.

This general pattern has often been observed in studies of break and enter (Shover 1991, Cromwell, Olson and Avary 1991) and contradicts the popular view of the burglar striking under cover of darkness. There is some evidence that the highest risk occurs soon after the household is left vacant. For the burglar, entry to premises soon after it has been vacated offers maximum protection from the unexpected return of occupants. This means that the period shortly after a house has been vacated in the morning is a very attractive time for the burglar to operate. Cromwell, Olson and Avary (1991)

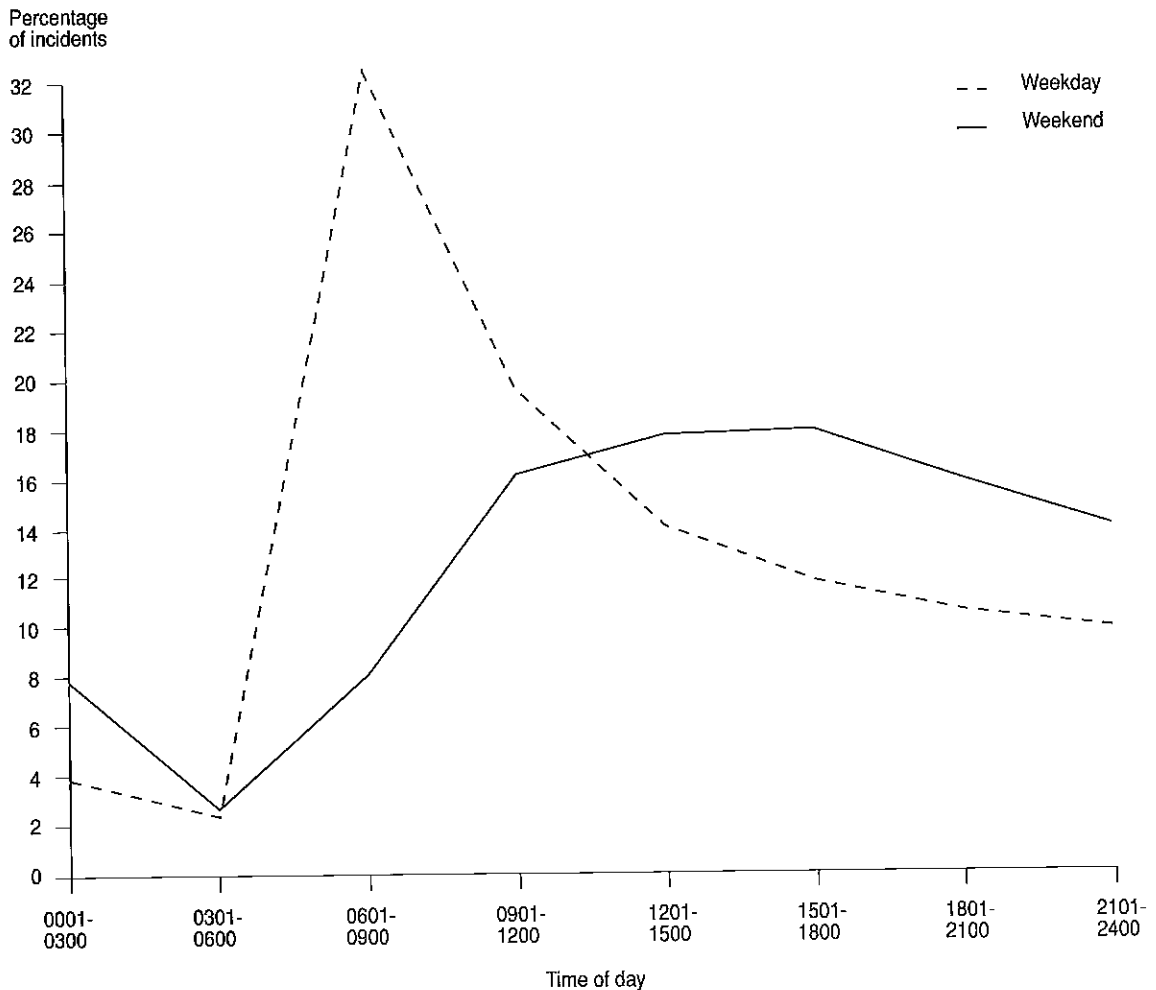
**Figure 10: Time of day of break and enter in high and low break and enter rate CDs in Waverley**



found that burglars often watched and waited until women left the house to take children to school or go shopping, and then effected a relatively rapid entry and escape. This means that the data presented in Figure 10 are not likely to be too far from the actual pattern of break and enter during the day, although the real peak would probably be smaller than that shown in Figure 10.

The observation that burglary is strongly related to the times in which households are left unoccupied is confirmed by Figure 11, which shows the time of day for burglaries occurring on weekdays and weekends. For break and enters occurring on weekdays, the most popular time for the commission of the offence was in the morning. For break and enters occurring on the weekend, offences peaked during daylight hours, between 0901 and 2100 hours. On weekends, a relatively small proportion of break and enters are recorded between 0601 and 0900 hours, the peak time for weekday burglaries. This

**Figure 11: Time of day and day of week of break and enter offences in Waverley**



variation of time of day for different days of the week was strongly significant ( $X^2 = 137.7$ , d.f. = 7,  $p < 0.05$ ). Interestingly, this pattern has also been described in research conducted in Canada (Gabor 1990).

### 5.3 POINT OF ENTRY AND METHOD OF ENTRY

As can be seen from Table 5, both the high and low break and enter CDs showed the same patterns of point of entry. There was no statistically significant difference between the patterns of point of entry in the high and low break and enter rate CDs ( $X^2 = 5.7$ , d.f. = 4,  $p > 0.05$ ). Most commonly, break and enter was effected by entry through a door (55.4 per cent) or window (39.6 per cent). In 38.3 per cent of cases entry

was through the front door. In 69.6 per cent of cases there was no use of a tool or implement recorded, with a further 23.7 per cent of cases employing simply a jemmy or screwdriver. This suggests that in many cases burglars in Waverley were able to take advantage of poorly protected premises. Entry appears to have been effected through unlocked doors or windows, or using unsophisticated methods like simply kicking open a door or breaking or forcing a window. These observations accord with those made by researchers overseas, where it has been found that between 25 and 50 per cent of cases of completed household break and enter involve unforced entry (Bureau of Justice Statistics 1989; Cromwell, Olson and Avary 1991). Sophisticated methods of entry such as cutting through roofs or walls, or by-passing alarms, have been found to be uncommon (Rengert and Wasilchick 1985). In only one case in Waverley did police record that the method of entry involved circumventing an alarm and in only two cases was it recorded that bars or grills were cut or removed.

**Table 5: Point of entry of break and enter offences occurring in the high and low break and enter rate CDs in Waverley**

<i>Point of entry</i>	<i>High break and enter rate CDs (33 CDs)</i>		<i>Low break and enter rate CDs (99 CDs)</i>		<i>Total (132 CDs)</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
Window	328	39.2	563	39.9	891	39.6
Front door	316	37.8	545	38.6	861	38.3
Other door	158	18.9	226	16.0	384	17.1
Other	11	1.3	17	1.2	28	1.2
Unknown	24	2.9	61	4.3	85	3.8
Total	837	100.0	1412	100.0	2249	100.0



## **6. CONCLUSION: CRIME PREVENTION STRATEGIES IN LOCAL AREAS**

In this section a number of general and specific responses to the findings outlined in the previous sections are discussed. Although some of this discussion refers to Waverley LGA in particular, many of the responses can be adapted to specific crime problems in other areas. As will be clear, responses to crime prevention problems may involve the local community, Local Government, police and State Government.

As was suggested in the Introduction, targeting crime control efforts is an efficient way to mobilize scarce resources. The foregoing analysis also suggests that such targeting may be a more effective approach than blanket coverage. This is because, as demonstrated in Waverley, assault and break and enter may be very concentrated. A high proportion of assault and break and enter offences were located in a small proportion of the streets and areas of the Waverley LGA. Crime control efforts that are adapted to the patterns of hot and cold spots for particular offences offer considerable potential for maximizing the effect of crime control resources. According to this view, crime control resources should be directed towards the high crime places in an LGA, where they are most needed. Since these areas are responsible for a considerable proportion of offences, resources will then be more effectively utilized because they are spread among a smaller proportion of people or places in an LGA.

### **6.1 GENERAL RESPONSES**

The findings presented in the previous sections have a number of obvious implications for the prevention of crime in Waverley. Information which points to places and times of greatest risk can assist in effective targeting of crime control resources. It is also likely that specific information on places and times of risk can be used in public education campaigns to help increase the public awareness of crime control measures. Such information may also have a role to play in improving recruitment and on-going participation in specific crime prevention campaigns.

Perhaps the most obvious application of the kind of information presented in this report is in the effective targeting of police resources. It is impossible for police to maintain surveillance of every potential trouble spot in Waverley, so it is necessary to organize existing resources so that maximum benefit is derived from their deployment. Community based policing, which in part depends on the visibility of police in local neighbourhoods, can be more effective if patrols in peak offending areas are organized to correspond to peak offending periods. Because the peak times for burglary are different from those for assault, a community based patrol aimed at burglary prevention will necessarily have a different temporal pattern than one that is intended to deter assault. It is also likely that different kinds of community police presence would be required for prevention of domestic violence than for prevention of violence in and around licensed premises.

As well as lack of effective targeting, research has often identified lack of on-going

participation as a problem that has limited the effectiveness of some crime prevention programs. There is certainly a role for local council and community groups in fostering participation in crime prevention programs like neighbourhood watch. Roberts and Grossman (1990) have recently pointed out that community participation in crime prevention programs depends on public knowledge of, and attitudes to, crime prevention initiatives. It is likely that public education and information programs about crime prevention that are tailored to specific areas with specific crime problems will have greater success than more general, non-specific campaigns. The recognition of such a local problem may be a useful tool to galvanize the support of local residents for crime prevention initiatives. Local councils can potentially adopt a leadership role in the co-ordination of such narrowly targeted crime control programs.

## 6.2 SPECIFIC RESPONSES

### 6.2.1 *Break and enter*

It is possible that significant gains can be made through fostering better protection of homes through target hardening. The data on point and method of entry discussed in the previous section, as well as international evidence, suggest that there is no shortage of poorly protected premises that are attractive to the burglar. Evaluation studies have shown that target hardening through the provision of deadbolt locks and similar techniques can lead to significant reductions in break and enter rates (Rubenstein, Murray, Motoyama, and Rouse 1980). Target hardening is a technique that can reduce burglary risk for any particular dwelling, regardless of whether it is in a high or low crime rate area. However, knowledge of the hot spots for burglary would allow programs encouraging target hardening to be directed at the high risk neighbourhoods, thus maximizing the impact of increased security.

The success of target hardening compared with other crime prevention measures (Rosenbaum 1988) suggests that it should be a key tactic in the development of anti-burglary strategies. Of course, increasing security awareness has been a key aim of neighbourhood watch, although low participation levels and lack of on-going support may have limited the success of neighbourhood watch in increasing security in local communities. Local councils may have a role to play in increasing public awareness of the necessity for the adoption of better household security. It may be possible that local council planning powers could address the problem, particularly for new housing developments. The mobilization of State government planning and design standards to effect a general increase in security levels in residential housing development may also be a useful strategy.

There is evidence, however, that target hardening may lead to a displacement of burglary, rather than a decrease in overall risk. According to a number of studies, when faced with a difficult entry, or one rendered dangerous by an alarm, many burglars will simply look for a nearby easier target (Rengert and Wasilchick 1985, Cromwell, Olson and Avary 1991). In the words of Clarke (1983, p. 246) 'within easy reach of every house with a burglar alarm or car with an antitheft device there are many others without such protection'. This means that the installation of better security in a proportion of

households may protect those dwellings, but increase the risk for nearby households that do not have the benefit of secure windows and doors. Such displacement effects can be monitored using crime mapping techniques, allowing crime prevention programs to be adjusted to changing crime patterns.

As the large numbers of break and enters which do not appear to involve forced entry would suggest, no locks or security devices can protect against carelessness. As well as encouraging participation in neighbourhood watch, public education campaigns can have a positive role in educating people in the importance of installing and employing household security. Again, Local Government and local police through neighbourhood precincts or neighbourhood watch groups can have a key role to play in the development of such a public education campaign. Information on crime patterns at the neighbourhood level can be used to identify the areas where such campaigns can be most effectively targeted.

People in rented accommodation may face particular difficulties with protection from burglary through target hardening. This is an issue which looms large in Waverley, where 43.8 per cent of households are rented, compared with 27.8 per cent of households in the Sydney Statistical Division as a whole. As Rosenbaum (1988) has commented, although there is consistent evidence that target hardening is associated with a lower risk of break and enter, the benefits are available only for people who are able to pay for security hardware. For people who are renters, there may not be as much incentive to spend money on security, and lease provisions may limit the extent to which tenants can engage in the necessary renovations. Also, owners of rented premises may not feel obliged to provide a high level of security, particularly in the case of older properties. Although the *Landlord and Tenant Act 1899* (as amended) requires that landlords provide security in rented premises, there is no definition under the Act as to what constitutes adequate security. Tenants may also not be aware of their rights in this respect.

### 6.2.2 Assault

Many assaults in Waverley occur either in the streets or in licensed premises. The unit record data analyzed here allow positive identification of the hotels and clubs which generate many of the assaults. These kinds of assaults may be particularly likely to respond to greater visibility of beat police in hot spots during peak times. The frequency of assault in the streets would suggest that the provision of better street lighting may have a role to play in the prevention of such assaults, although evaluation of street lighting projects has not found that this initiative has been consistently successful (Tein, O'Donnell, Barnett and Mirchandani 1979; Atkins, Husain and Storey 1991; Ramsey and Newton 1991). As with other crime prevention initiatives, the provision of better lighting is most probably a response that can deter crime only in certain conditions.

The frequency of assaults in and around hotels suggests that there is potential for a number of interventions that could help moderate the amount of alcohol-related crime occurring in Waverley. Homel, Tomsen and Thommeny's research on hotel and club violence suggests that a number of situational factors may be able to be manipulated in order to moderate such violence (Homel, Tomsen and Thommeny 1991; Tomsen, Homel and Thommeny 1991; Homel and Tomsen 1991). This study found that violence was more common in establishments that were characterized by lack of comfort generated by loud, poor quality music, lack of ventilation and overcrowding, high levels of

drunkenness (often associated with discount drink promotions<sup>11</sup>), unavailability of food and aggressive and unreasonable bouncers. It is certainly possible that some of these factors can be manipulated through regulation, as suggested by the researchers (Homel, Tomsen and Thommeny 1991, p. 118). Also, it is likely that it would be productive to enlist the co-operation of the management of such venues in the establishment of a crime prevention program, as has been done in Waverley. In response to the initial crime prevention project, Waverley Council has instituted a pilot server intervention project which aims at promoting more acceptable models of drinking and behaviour on licensed premises (Waverley Municipal Council 1991).

While recorded crime data indicate that assault is highly concentrated in Waverley, there is a need for community attention to be directed at the low assault rate areas of the LGA, where domestic assault is a major component of recorded violent crime. As already mentioned, it is likely that recorded assault rates in these areas understate the actual assault rate by a considerable margin.<sup>12</sup> It is probable that neighbourhood watch programs may be of limited use in addressing this largely hidden violence. However, the importance of reporting to the police visible or audible violence within neighbouring homes can be stressed in neighbourhood watch groups. There have been considerable gains in recent years in the response to domestic violence by the courts and police (Stubbs and Powell 1989). However, recent evidence from the United States (Sherman, Schmidt, Rogan, Gartin, Cohn, Collins, and Bacich, 1991) raises questions about the appropriateness and effectiveness of an over-reliance on police and courts in addressing the problem of domestic violence. In many situations, more flexible responses may be more appropriate, or at least may be a valuable adjunct to arrest and prosecution.

Municipal councils can take a leading role in the development of campaigns against domestic abuse that are tailored to the type and extent of abuse in the local community. In 1990 the Waverley council approved a grant of \$3,000 towards the establishment of a domestic violence support group (Waverley Municipal Council 1991). Such support groups, augmented by information and education campaigns, can potentially lead to greater public recognition of the plight of victims of domestic violence, and can encourage increases in the reporting rate for this offence.

### 6.3 CONCLUSION

The discussion in the previous sections alluded to the role of police, local community groups, local and State government and the public in the formulation of effective crime prevention strategies. As well as being targeted to specific problems and specific areas, it is important that crime control strategies are multi-faceted and co-ordinated. That is, we must recognize that no one response will be effective in itself. One example of a co-ordinated approach is the social strategy for crime prevention in Canada formulated by the Canadian Criminal Justice Association (1989), which integrates a wide range of responses to crime problems.

One way in which co-ordination between different agencies could enhance crime prevention strategies would be for police and local governments to co-operate in the generation of data of the sort presented in this report. Direct entry of police data on a database within each police station would allow the generation of up-to-date maps of crime patterns in a local area. Such a system could form the basis for fruitful

co-operation between police, local government and the local community, and would not be subject to the delays inherent in the process of drawing data from a large, centralized system. The data collected on such a system could be tailored to local demands and be much more flexible than a centralized database.

A different approach to providing such flexible and timely data has been adopted in Victoria. The Victorian Computer Assisted Dispatch System is a computerized database of calls for police service which incorporates a geographic database and offers significant advantages over conventional recorded offence databases (Victoria Police 1990). This kind of database can be managed from the radio branch where police patrols are despatched to incidents reported by the public. Police recorded crime statistics only contain information about incidents where an offence is recorded. In many cases, police may arrive at an incident too late to ascertain the details of an offence such as an assault in a public place, or may deal with a situation without making an arrest and subsequently recording an offence. Calls-for-service data may point to trouble spots that are not apparent in recorded crime. This kind of system provides a much more accurate account of the number and type of incidents attended by police than recorded crime statistics. Such a Computer Aided Despatch System can provide considerably improved management information, crime analysis, resource allocation and patrol deployment (Victoria Police 1990).

As well as guiding the allocation of crime prevention resources, the provision of up-to-date crime data at the neighbourhood level can provide information necessary to monitor and evaluate crime prevention programs. As mentioned above, the possibility of displacement of crime means that it is necessary that crime prevention programs are flexible enough to be adapted to changing crime patterns.

In conclusion, target hardening, neighbourhood watch surveillance (for both household security and domestic violence problems), beat policing, enforcement of liquor licensing regulations, and server intervention programs are all examples of community crime prevention programs which can be implemented at a local neighbourhood level. To be fully effective, however, all of these programs need to be specifically targeted at the locations and times of day that crimes occur. The mapping and analysis of local area crime data is therefore a necessary tool for problem identification and monitoring, and for the evaluation of crime prevention initiatives.

## NOTES

- <sup>1</sup> Mapinfo is the registered trademark of Mapping Information Systems Corporation and is distributed in Australia by Peripheral Systems Pty Ltd.
- <sup>2</sup> SAS is the registered trademark of the SAS Institute Inc., Cary, NC, USA. The software is available from the SAS Institute Australia Pty Ltd.
- <sup>3</sup> These map files can be purchased from Mapinfo.
- <sup>4</sup> When break and enter is rated against population, Waverley ranks 5th of the LGAs in the Sydney Statistical Division. However, the rate per household is generally considered a more accurate figure with which to compare relative break and enter risk. This is because it is the number of households rather than the population of the area which defines the universe of potential break and enter targets (Herbert 1982, p.45). The difference between the two ways of calculating break and enter rates reflects the greater number of single person households and smaller family size in inner city suburbs. For example, at the 1986 census over 31.2 per cent of Waverley's households were single person households, compared with 19.8 per cent of the households in the Sydney Statistical Division as a whole. This means that the number of households is relatively large in proportion to the population in inner city LGAs like Waverley, and these LGAs will thus tend to rank lower on a target specific break and enter rate than on a population specific rate. Notwithstanding this, overall the two ways of calculating break and enter rates in Sydney LGAs produce statistically similar series (correlation coefficient:  $r = 0.81$ ,  $p < 0.05$ ).
- <sup>5</sup> The data in this report therefore differ from the published statistics for the Waverley LGA (NSW Bureau of Crime Statistics and Research 1991), which include all recorded offences. The data used here also differ from the published data in one other respect. For LGA statistics published by the Bureau of Crime Statistics and Research offence data are allocated to LGA on the basis of postcode. As postcodes often cross LGA boundaries, proportional allocation of offences is used to assign offences to LGAs. The data for this study were instead allocated to Waverley on the basis of street address. Nevertheless, the differences are small: in 1989 and 1990 the LGA statistics published by the Bureau reported 643 assaults and 2,284 break and enters in Waverley. For this report, 597 assaults and 2,249 break and enters were included in the data set.
- <sup>6</sup> Census data were obtained in electronic form from Census Applications Pty Ltd, a licensed secondary provider of census information.
- <sup>7</sup> A rate of 10 per 1,000 population over two years represents an annual rate of 5 per 1,000, or 1 in 200.
- <sup>8</sup> It is possible that other cases actually occurred outside a hotel or club but such information was not recorded on the database. However, it is unlikely that the proportion of such cases would vary between low and high assault rate CDs.
- <sup>9</sup> In 3.7 per cent of cases, sex of victim was not recorded.
- <sup>10</sup> Some households were victimized more than once.
- <sup>11</sup> In one case, after paying an \$11.00 cover charge, patrons could obtain drinks for 11 cents each. The effect of such a promotion would appear to be to encourage patrons to consume as many cheap drinks as possible, so as to recover the cost of the cover charge.
- <sup>12</sup> However, this is also likely to be true for the high assault rate areas, as already argued.

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